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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/843,573 | 04/26/2001 | Michael J. Demler | ANTR-01020us1 | 1067 |

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EXAMINER

HOGAN, MARY C

ART UNIT PAPER NUMBER

2123

DATE MAILED: 09/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/843,573 | DEMLER ET AL. | |
| | Examiner | Art Unit | |
| | Mary C Hogan | 2123 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/9/02.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This application has been examined.
2. **Claims 1-24** have been examined and rejected.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

4. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

5. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims **1,2,3,6,7,10,11,21-23** are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over **Claims 1,3,4,6 and 7** of copending Application No. 09560844 in view of Mendel (U.S. Patent Number 6,080,204), herein referred to as **Mendel**. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

7. **Claims 1,2,3,6,7,10,11,21-23** of this application, herein referred to as '**573**', discloses the same elements as the copending application, 09560844, herein referred to as '**844**', as follows:

8. **Claims 1 and 10**: generating a set of circuit parameters ('**844**, **Claim 5**); passing set of circuit parameters ('**844**, **Claim 1**, lines 12-14); running a simulation on a test bench ('**844**, **Claim 1**, lines 3-4, 9-11, **Claim 3**, lines 10-11).

9. **Claims 2 and 11**: optimizer ('**844**, Claim 1, lines 5-8, Claim 7, lines 2-4).

10. **Claim 3**: generating new circuit parameters ('**844**, Claim 7, lines 5-7).

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11. **Claims 6,7, 22 and 23:** lookup data base and saving optimized performance characteristics to lookup database (**'844, Claim 6**).
12. **Claim 21:** a synthesis plan (**'844, Claim 4**).
13. The difference between the claims of **'573** and **'844** is that **'844** does not disclose "simultaneous" passing of parameters and multiple test benches. It was determined from the specification and **Figure 2** that the movement of the circuit parameters of **element 204** to the corresponding circuit models of **element 206** correspond to this "simultaneous" passing of parameters, however, it is not specified that these parameters are passed at *exactly* the same time. Therefore, it was determined that this "simultaneous" passing of parameters simply implies that the parameters are passed to different circuit models at *around* the same time, not necessarily at *exactly* the same time.
14. **Mendel** teaches a parallel processing system that includes the simultaneous passing of circuit parameters and multiple test benches (**Figure 3A**) wherein compilation includes simulation (**column 6, lines 27-32**) since parallel processing uses multiple CPUs to work on different aspects of the compilation project simultaneously, thus reducing the total amount of time it takes to compile the entire project (**column 14, lines 48-51**) which is important since longer development times greatly slow the time to market and slow development can erase any commercial advantage (**column 3, lines 6-12**).
15. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optimizing and synthesizing steps as disclosed in **'844** to include the functionality for a parallel processing system allowing the simultaneous passing of circuit parameters and multiple test benches as taught in **Mendel** since parallel processing uses multiple CPUs to work on different aspects of the compilation project simultaneously, thus reducing the total amount of time it takes to compile the entire project (**column 14, lines 48-51**) which is important since longer development times greatly slow the time to market and slow development can erase any commercial advantage (**column 3, lines 6-12**) as taught in **Mendel**.

Specification

16. The disclosure is objected to because of the following informalities. Appropriate correction is required.
17. **Figure 4** is not discussed in the specification except in the Brief Description of Figures.

Claim Interpretation

18. **Claims 1 and 10** recite the term “simultaneously”. It was determined from the specification and **Figure 2** that the movement of the circuit parameters of **element 204** to the corresponding circuit models of **element 206** correspond to this “simultaneous” passing of parameters, however, it is not specified that these parameters are passed at *exactly* the same time. Therefore, it was determined that this “simultaneous” passing of parameters simply implies that the parameters are passed to different circuit models at *around* the same time, not necessarily at *exactly* the same time.

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

21. **Claims 1-15, 19-23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Killian et al (U.S. Patent Number 6,477,683), herein referred to as **Killian** and further in view of **Mendel**.

22. As to **Claims 1 and 10**, **Killian** teaches: a method of optimizing performance characteristics in circuit synthesis, comprising the steps of: (a) generating a set of circuit parameters for each performance characteristic of a circuit (**column 17, lines 30-32**); (b) passing circuit parameters through a respective circuit model (**column 17, lines 32-36 and column 23, line 47, “HDL model”**); and (c) running a simulation of said circuit model on an analysis test bench in order to measure performance of said circuit model using said set of circuit parameters, the analysis test bench adapted to model circuitry external to

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said circuit and control the type of analysis to be performed for each said performance characteristic of said circuit (**column 23 line 46-column 24, line 3**).

23. **Killian** does not expressly teach the simultaneous passing of circuit parameters and multiple test benches.

24. **Mendel** teaches a parallel processing system that includes the simultaneous passing of circuit parameters and multiple test benches (**Figure 3A**) wherein compilation includes simulation (**column 6, lines 27-32**) since parallel processing uses multiple CPUs to work on different aspects of the compilation project simultaneously, thus reducing the total amount of time it takes to compile the entire project (**column 14, lines 48-51**) which is important since longer development times greatly slow the time to market and slow development can erase any commercial advantage (**column 3, lines 6-12**).

25. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optimizing steps as taught in **Killian** to include the functionality for a parallel processing system allowing the simultaneous passing of circuit parameters and multiple test benches as taught in **Mendel** since parallel processing uses multiple CPUs to work on different aspects of the compilation project simultaneously, thus reducing the total amount of time it takes to compile the entire project (**column 14, lines 48-51**) which is important since longer development times greatly slow the time to market and slow development can erase any commercial advantage (**column 3, lines 6-12**) as taught in **Mendel**.

26. As to **Claims 2 and 11**, **Killian** teaches: the step of receiving the measurements of performance for each simulation in an optimizer, said optimizer adapted to determine whether specifications were met for said simulation (**column 6, lines 62-64 and column 18, lines 47-64**).

27. As to **Claim 3, 4 and 13**, **Killian** teaches: the step of generating new set of circuit parameter values in said optimizer (**column 18, lines 61-67**); passing said new set of circuit parameter values through the respective said circuit model (**column 6, lines 62-64 and column 18, lines 61-67**) wherein individual parameters of the design are changed and the circuit is iteratively optimized which would involve the changing and passing of new circuit parameters through the circuit model for further testing and optimizing.

28. As to **Claim 5**, **Mendel** teaches: assigning each said analysis to a separate processor for parallel processing (**Figure 3A and column 16, lines 14-18**).

29. As to **Claim 6**, **Killian** teaches: the step of checking a lookup database for previously optimized performance characteristics (**column 18, lines 26-34 and column 19, lines 33-35**).

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30. As to **Claim 7, Killian** teaches: the step of saving optimized performance characteristics to a lookup database (**column 19, lines 33-35**).
31. As to **Claim 8, Killian** teaches: the step of setting up ranges for each said analysis test bench and providing design parameters using a simulation script (**column 23, lines 46-58**) wherein the test programs include ranges for the test bench to determine if the circuit design is operating within the circuit specifications of the design.
32. As to **Claim 9, Killian** teaches: the step of mapping the function of a design parameter to a performance characteristic (**column 18, lines 20-23**) wherein the design parameters specified by the user constitutes goals for the performance characteristics of the design.
33. As to **Claim 12, Killian** teaches: said optimizer comprises an optimization algorithm (**column 18, lines 47-48, 59-61**).
34. As to **Claim 14, Mendel** teaches: a simulator for each said analysis test bench (**Figures 3A and 3B and descriptions**) wherein the compiler functions include simulating the design (**column 6, lines 28-33**).
35. As to **Claims 15, Mendel** teaches: each said analysis test bench is adapted to run multiple occurrences of said analysis for each said circuit (**Figure 3B and description**).
36. As to **Claim 19, Mendel** teaches: a processor for each said circuit model (**column 17, lines 47-53**).
37. As to **Claim 20, Mendel** teaches least one simulation script for each said circuit model (**column 16, lines 2-15**).
38. As to **Claim 21, Killian** teaches: a synthesis plan adapted to set out rules for said analysis (**column 7, lines 38-42**).
39. As to **Claims 22 and 23, Killian** teaches: a lookup database wherein said lookup database includes a set of performance specifications for each said circuit model (**column 18, lines 26-34, 47-48 and column 19, lines 33-35**) wherein the input goals are performance specifications.
40. **Claims 16 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Killian and Mendel** as applied to **Claim 10** above, and further in view of Rajsuman et al (U.S. Patent Number 6,678,645), herein referred to as **Rajsuman**.
41. As to **Claims 16 and 17, Killian and Mendel** teach a simulation system (**Killian: column 23 line 46-column 24, line 3, Mendel: Figure 3B and description**).
42. **Killian and Mendel** do not expressly teach these settings including operating conditions such as temperature, supply voltage and fabrication process.

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43. **Rajsuman** teaches various basic types of verification tests corresponding to different levels of design abstraction which include corner testing which is testing for complex scenarios and corner cases such as minimum and maximum conditions in voltage, temperature and process (**column 2, lines 16-25 and 28-30**).

44. It would have been obvious to one of ordinary skill in the art at the time the invention was made to simulate the models as disclosed in **Mendel** over operating conditions such as temperature, supply voltage and fabrication process as taught in **Rajsuman** if the design in **Mendel** was a system on a chip IC that required basic verification tests such as corner testing as taught in **Rajsuman**.

45. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Killian and Mendel** as applied to Claim 10 above, and further in view of MicroSim ("MicroSim Pspice A/D & Basics+ Circuit Analysis Software, User's Guide", Version 8.0, June 1997, pages 1-2-1-14, 2-2-2-5), herein referred to as **MicroSim**.

46. As to **Claim 18**, **Killian and Mendel** teach a simulation system (**Killian: column 23 line 46-column 24, line 3, Mendel: Figure 3B and description**).

47. **Killian and Mendel** do not expressly teach circuitry is selected from the group consisting of stimuli, power supplies, and load devices.

48. **MicroSim** teaches software to simulate a design in which load devices and power supplies can be selected (**page 2-2, "To Place Voltage Sources", page 2-3, "To Place Other Components" such as resistors and capacitors**) and stimuli can be applied to the circuit being tested (**page 1-14, "Stimulus File"**). The software models the behavior of a circuit containing any mix of analog and digital device that can be used to test and refine a design before realizing the design in hardware (**page 1-2, first paragraph**).

49. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a simulation program as taught in **MicroSim** as the simulation system as taught in **Killian and Mendel** since **MicroSim** teaches software in which circuitry such as stimuli, power supplies and load devices can be chosen that can be used to test and refine a design before realizing the design in hardware (**page 1-2, first paragraph**).

50. **Claim 24** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Killian and Mendel** as applied to **Claim 10** above and further in view of Kang et al (Kang et al, "CMOS Digital Integrated Circuits, Analysis and Design", second Edition, WCB/McGraw Hill, 1999, chapter 4), herein referred to as **Kang**.

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51. As to **Claim 24, Killian and Mendel** teach a simulation system (**Killian: column 23 line 46-column 24, line 3, Mendel: Figure 3B and description**).
52. **Killian and Mendel** do not expressly teach said design parameters are selected from the group consisting of transistor dimensions, bias current values, and adjustable circuit parameters.
53. **Kang** teaches a transistor model simulated in SPICE in which design parameters include the transistor dimensions (**page 118, last paragraph, L and W**), bias current values (**page 119, equation 119, where κ , γ , W and L can be specified and are used to calculate the current**) and adjustable circuit parameters (**page 122, paragraph above equation 4.5**) wherein these parameters can be specified.
54. It would have been obvious to one of ordinary skill in the art at the time the invention was made that a common transistor model such as the one used for SPICE simulations could be used to simulate the design in **Killian and Mendel** if the design in **Killian and Mendel** required a transistor model analysis. Furthermore, in using this transistor model as taught in **Kang**, design parameters would be selected from the group consisting of transistor dimensions, bias current values, and adjustable circuit parameters (**page 118, last paragraph, L and W, page 119, equation 119, where κ , γ , W and L can be specified and are used to calculate the current, and page 122, paragraph above equation 4.5**).

Conclusion

55. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary C Hogan whose telephone number is 703-305-7838 or 571-272-3712 starting mid-October 2004. The examiner can normally be reached on 7:30AM-5PM Monday-Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska can be reached on 703-305-9704. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mary C Hogan

Examiner

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JEAN R. HOMERE
PRIMARY EXAMINER